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WE CLAIM:

-1-

A method for forming a diamond thin film which comprises:

(a) vapor depositing a diamond thin film (DTF) on a substrate which is dissolvable by a chemical solution which does not dissolve the DTF;

(b) dissolving the substrate in the chemical solution so that the thin film remains in the chemical solution and is drapable; and

(c) removing the drapable DTF from the chemical solution and placing the DTF into a non-etching solution so that the DTF floats on the surface of the aqueous non-etching solution.

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The method of Claim 1 wherein in addition the DTF is removed from the non-etching solution and deposited while wet on a support means.

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The method of Claim 2 wherein the support means is placed in the non-etching solution and then removed from the non-etching solution with the DTF on the support.

-4-

The method of Claims 1 or 2 wherein the non-etching solution is an aqueous solution.

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The method of Claims 1 or 2 wherein the non-etching solution is essentially water.

-6-

The method of Claims 1 or 2 wherein the DTF provides a window which is transparent to electromagnetic radiation in a holder as a support.

-7-

The method of Claim 2 wherein the DTF is secured by bonding to the support means.

-8-

The method of Claim 1 wherein the film has a thickness of about 10 microns or less.

-9-

A method for forming a composite structure with a diamond thin film which comprises:

(a) vapor depositing a diamond thin film (DTF) on a substrate which is dissolvable by a chemical solution which does not dissolve the DTF;

(b) dissolving the substrate in the chemical solution so that the thin film remains in the chemical solution and is drapable;

(c) removing the drapable DTF from the chemical solution and placing the DTF into a non-etching solution so that the DTF floats on the surface of the aqueous non-etching solution;

(d) placing the drapable DTF on a support means; and

(e) securing the flexible DTF on the

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support means to form the composite structure.

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The method of Claim 9 wherein the DTF is removed from the non-etching solution and deposited while wet on the support means.

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The method of Claim 9 wherein the support means is placed in the non-etching solution and then removed from the non-etching solution with the DTF on the support.

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The method of any one of Claims 9, 10 or 11 wherein the non-etching solution is an aqueous solution.

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The method of any one of Claims 9, 10 or 11 wherein the non-etching solution is essentially water.

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The method of any one of Claims 9, 10 or 11 wherein the DTF provides a window in the holder which is transparent to electromagnetic radiation.

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The method of Claim 9 wherein the DTF is secured by bonding to the support means.

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A composite structure prepared by the method which comprises:

vapor depositing a diamond thin film (DTF) on a substrate which is dissolvable by a chemical solution which does not dissolve the DTF;

dissolving the substrate in the chemical solution so that the thin film remains in the chemical solution and is drapable;

removing the drapable DTF from the chemical solution and placing the DTF into a non-etching solution so that the DTF floats on the surface of the aqueous non-etching solution;

placing the drapable DTF on a permanent support means; and

securing the drapable DTF on the support means to form the composite structure, wherein the DTF is transparent to electromagnetic radiation.

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The structure of Claim 16 wherein the DTF provides a transparent window in the support means.

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The structure of Claim 16 wherein the DTF is secured by being bonded to the support means.

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A wetted drapable diamond thin film wherein the film can be wrapped around a round rod having a diameter of 3 mm or more.

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The film of Claim 19 which is wetted with water.

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The film of Claim 19 which has a thickness of 10 microns or less.